AF/JFW

Our Reference: DFS-170-A PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Gernot Schmierer et al
Serial Number:	10/767,641
Filing Date:	January 29, 2004
Examiner/Art Group Unit:	Eshter O. Okezie/3654
Title:	SUCTION GRIP ARM

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Serial Number:	10/767,641
Filing Date:	January 29, 2004
Examiner/Art Group Unit:	Okezie, Esther O. / 3652
Title:	SUCTION GRIP ARM

APPEAL BRIEF

MAIL STOP APPEAL BRIEF - PATENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Please enter the following Appeal Brief in the appeal filed on March 28, 2006.

REAL PARTY IN INTEREST

The real parties in interest are J. Schmalz GmbH and Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V. by assignment from the inventors Gernot Schmierer, Kurt Schmalz, Stanislav Gorb, and Eduard Arzt.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences in the present application.

STATUS OF CLAIMS

Claims 1-24 are pending in the application. Claims 1, 2, 5, 6, 11-17 and 24, stand rejected under 35 U.S.C. § 102(b) as being anticipated by Boyd et al. (U.S. Patent No. 5,799,661). Claim 18 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Reimann

(U.S. Patent No. 6,203,083). Claims 3, 4, 7-10, 22 and 23, stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Boyd et al. (U.S. Patent No. 5,799,661). Claims 19-21 are objected to as depending from a rejected base claim, but are indicated as otherwise being allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claims. Claims 1-24 are being appealed. The language of the current claims on appeal is attached as Appendix A.

STATUS OF AMENDMENTS

An after final Amendment was filed on February 28, 2006 to address the objection of claims 19-21 by rewriting the claims in independent form so as to place the claims in a condition for allowance. The Amendment was refused entry. The Examiner contends that entry of the after final Amendment would not place the application in a better condition for appeal by materially reducing or simplifying the issues for appeal. All other previous amendments in the present application have been entered.

SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention claims a vacuum gripper (10) for grasping an object to enable the object to be held in position or manipulated. (Paragraph [0002]). As recited in claim 1, vacuum gripper (10) includes a flexible suction body (20) having a contact surface (28) that can abut a work piece (32). (Paragraph [0029], lines 4-5; Figs. 1 and 4). A side of suction body (20) facing work piece (32) includes a peripheral lower edge configured as a sealing lip (22). (Paragraph [0029], lines 5-7; Figs. 1, 4 and 6). Sealing lip (22) bounds a vacuum chamber (26) connected to a vacuum source by means of connection (14). (Paragraph [0029], lines 7-9; Fig. 1). Contact surface (28) of suction gripper (20) abuts work piece (32) when a vacuum is applied to the suction gripper. (Paragraph [0029], lines 9-11; Figs. 1, 2 and 4). Contact surface (28) includes a microstructure (38) formed from rod-shaped, louver-shaped or pin-shaped elements (34). (Paragraph [0006]; Figs. 2-7). Elements (34) have a free end (36) that is intersected by a longitudinal axis of elements (34). (Paragraph [0030]; Paragraph [0031], lines 4-8; Figs. 2-5).

Free end (36) of elements (34) is displaced away from contact surface (28). (Paragraph [0032]; Figs. 2-5). The longitudinal axis is oriented so as to intersect contact surface (28). (Figs. 2, 4, and 5).

As recited in claim 13, elements (34) having a flat cross section are aligned so the flat cross section extends in the circumferential direction of the suction gripper. (Paragraph [0014], lines 5-8; Paragraph [0031], lines 9-11; Figs. 3c and 3d).

As recited in claim 8, elements (34) are made of a plastic material. (Paragraph [0011], lines 1-2).

As recited in claims 9 and 10, elements (34) have a length that is between two and twenty times greater than a thickness of the elements and are spaced between 0.5 and 2.5 times the thickness of the elements. (Paragraph [0013]; Figs. 6 and 7).

As recited in claim 6, elements (34) are disposed on a carrier (42) that is attached to suction body (20). (Paragraph [0035]; Paragraph [0012]; Figs. 4 and 5).

As recited in claim 7, carrier (42) is configured as a plate or a film. (Paragraph [0012]; Figs. 4 and 5).

As recited in claims 22 and 23, elements (34) have a length that is five to ten times greater than a thickness of the elements and a spacing of one to two times the thickness of the elements. (Paragraph [0013]; Figs. 6 and 7).

The present invention is also directed at the method of producing a suction gripper (10) having a flexible suction body (20). (Paragraph [0019], lines 1-2). Claim 18 recites a flexible suction body (20) that includes a contact surface (28) and a microstructure (38) projecting from the contact surface. (Paragraph [0032]; Figs. 1, 2, and 4-8). Microstructure (28) consists of rod, louver, or pin-shaped elements. (Paragraph [0006]; Figs. 2-5). The method includes injection molding the suction body. (Paragraph [0019], lines 1-2; Paragraph [0020]; Paragraph [0035], lines 2-4).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

I. Whether claims 1, 2, 5, 6, 11-17 and 24 are anticipated under 35 U.S.C. § 102(b) by Boyd

et al. (U.S. Patent No. 5,799,661).

II. Whether claim 18 is anticipated under 35 U.S.C. § 102(b) by Reimann (U.S. Patent No. 6,203,083).

III. Whether claims 3, 4, 7-10, 22 and 23 are unpatentable under 35 U.S.C. § 103(a) over Boyd et al. (U.S. Patent No. 5,799,661).

ARGUMENTS

I. Rejection under 35 U.S.C. § 102(b) over Boyd et al. (U.S. 5,799,661)

Claims 1, 2, 5, 6, 11-17, and 24

In the Office Action dated November 30, 2005, the Examiner rejected claims 1, 2, 5, 6, 11-17, and 24 under 35 U.S.C. § 102(b) as being anticipated by Boyd et al. (U.S. Patent No. 5,799,661). The Examiner states that Boyd et al. discloses a gripper (Fig. 33A) for suctioning a work piece, the suction gripper having a flexible suction body (192). A side of the suction body (192) facing the work piece includes a sealing lip (200) bounding a vacuum chamber (194) connected by airflow to a vacuum connection. The suction body (192) including a contact surface (198) abutting the work piece with prevailing vacuum in the vacuum chamber and a microstructure (199) (Fig. 33C) consisting of one of a rod, louver, and pin-shaped elements projecting from contact surface (198). The Examiner contends that the elements have a free end intersected by a longitudinal axis of the elements, the free end being displaced away from the contact surface and the longitudinal axis oriented so as to intersect the contact surface.

The Boyd reference discloses a device for performing thoracoscopic cardiac procedures, specifically a device for picking up heart tissue to treat multi-vessel coronary artery disease without damaging the heart tissue. (See column 1, lines 14-19). The device includes a vacuum suction heart retractor (190) having an elongated tubular shaft (191) and a suction cup-shaped manipulator (193) on the distal end of the shaft (191). (See column 18, lines 17-19; Figs. 3A-3C). A vacuum lumen (194) adapted for attachment to a vacuum source, extends through shaft (191) to the distal end and is in fluid communication with the interior (195) of the suction cup (192). (See column 18, lines 26-32). Suction cup (192) is made of a flexible elastomeric

material, such as silicone rubber, that allows suction cup (192) to conform to the surface of the heart when a vacuum is applied to the interior (195) of suction cup (192). (See column 18, lines 57-65). As shown in Fig. 33B, the interior surface (198) of suction cup (192) is textured by a pattern of friction-increasing bumps (199) to create a friction surface. (See column 18, line 66; and column 19, line 2). Bumps (199) are shown to have a hemispherical shape (Fig. 33B). The friction-increasing bumps (199) may also have other geometries, such as conical and cylindrical. (See column 19, lines 6-8).

The Boyd reference does not disclose orienting the longitudinal axis of bumps (199) so as to intersect a free end of the bumps and contact surface (198). Claim 1 of the present application requires the longitudinal axis of the elements to intersect both the contact surface from which the element extends and the free end of the element, which itself is displaced from the contact surface. The term "longitudinal" commonly refers to the lengthwise dimension of a geometric shape, which in turn corresponds to the longest of three straight-line dimensions of a three-dimensional object. (Webster's Third New International Dictionary, unabridged, 1993). The longitudinal axis of claim 1 thus coincides with the longest dimension of the element. Orienting the friction elements so that the longitudinal axis (i.e., longest dimension) extends away from the contact surface, as claimed in the present application, enables the elements to buckle and bend when the contact surface of the suction body abuts the work piece. (See paragraph [0011] of the present application). In contrast to the claimed invention of the present application, the longitudinal axis of bumps (199) in the Boyd reference does not intersect both a free end of the bumps and contact surface (198), but instead extends parallel to the contact surface. The width of bumps (198) shown in Fig. 33B (measured parallel to contact surface (198)) is greater than the height of the bumps (measured perpendicular to contact surface (198)). Since the longitudinal axis coincides with the larger of the two dimensions, the longitudinal axis extends along the width, not the height, of the bumps, and parallel to contact surface (198). A line extending parallel to a surface, cannot by definition, intersect the surface, and as such, the longitudinal axis of the bumps does not intersect the contact surface as required by claim 1 of the present application. Furthermore, although Boyd discloses that bumps (199) may include other

geometries, such as conical and cylindrical, there is no mention of the orientation of the longitudinal axis of the bumps.

Boyd et al. also does not render obvious the concept of orientating the longitudinal axis of the friction-increasing bumps (199) so as to intersect both the free end of the bumps and contact surface (198). This would result in the bumps having a high profile, wherein the height of the bumps is greater than their width, rather than a low profile. There is nothing, however, in the Boyd reference that suggests configuring the friction-increasing bumps (199) to have a high profile rather than a low profile is preferred or even desirable. The Boyd reference only shows friction-increasing bumps having a low profile (i.e., their width is greater than their height). (See Fig. 33B). Low profile bumps minimize the possibility of the bumps puncturing or damaging the heart muscle tissue. Orienting the bumps so as to have the longitudinal axis (i.e., longest dimension of the bumps) extend out from rather than parallel to the contact surface rather will result in the bumps having a high profile. This would likely increase the localized pressure being asserted by the bumps on the heart muscle, which in turn could damage the heart muscle tissue, making such a configuration obviously undesirable.

Applicant also submits that the Boyd reference is not analogous art. The current invention discloses a suction gripping device for facilitating the picking up and transporting of large metal or glass sheets having a smooth surface that may also be wet or oily (See paragraphs [0002] and [008] of the present application). A person of ordinary skill in the art would not be motivated to look to a device for performing thoracoscopic cardiac procedures, specifically a device for picking up a heart without damaging the delicate heart tissue to treat multi-vessel coronary artery disease (see column 1, lines 14-19 of Boyd), as disclosed in the Boyd reference, for a solution for gripping a sheet of metal having an oily or slippery surface.

Accordingly, the Boyd reference fails to anticipate, teach, or suggest the claimed invention of the present Application.

Claim 6

With respect to claim 6, the Examiner asserts that Boyd discloses disposing elements 199 on a carrier to be attached to the vacuum gripper. The carrier as claimed in the

present application enables the elements to be easily replaced when they become worn by simply removing the carrier with the worn elements and replacing it with a new one. (See paragraphs [0012] and [0035] of the present application). The Examiner does not identify what feature of the device in Boyd is considered to correspond to the carrier of claim 6, but goes on to state that the pattern of bumps are disposed on surface (198). Since surface (198) is actually the inner surface of suction body (192), the bumps are shown attached directly the suction body, not to a carrier which attaches to the suction body as asserted by the Examiner. The Examiner apparently concurs with this interpretation in as much as the Examiner stated in connection with the rejection of claim 5 that the elements (i.e., bumps) are shown in Boyd to be disposes as one piece on the suction body. The Examiner's asserted interpretation of the Boyd reference is not supportable, and fails to meet the specific limitation of claim 6 of the present application. Accordingly, the Boyd reference fails to anticipate, teach or suggest the claimed invention of the present application.

II. Rejection of claim 18 under 35 U.S.C. § 102(b) over Reimann (U.S. 6,203,083)

Claim 18 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Reimann (U.S. 6,203,083). The Examiner asserts that Reimann discloses a method for producing a suction gripper having a flexible suction body (elastomeric insert 3) that includes a contact surface (5), a microstructure (9, 10, 11) formed of one of a rod, louver, and pin shaped elements, the method comprising the step of injection molding the suction body. The flexible elastomeric insert (3), which includes features the Examiner contends corresponds to the microstructure of the present invention, is not described in Reimann as being produced by injection molding. Reimann only discloses that that the grooves formed in body (2) for receiving the elastomeric insert (3) may be produced by injection molding (see column 2, lines 31-40, which is cited by the Examiner in support of the rejection). Reimann does not disclose that insert (3) may be formed by injection molding. Although Reimann does disclose that insert (3) may be cast or molded into the receiving groove of base body (2) (see column 2, lines 24-25), Applicant interprets that to mean that insert (3) can be attached to the mold for producing base body (2).

The combination base body (2) and insert (3) can then be formed by injection molding base body (2) around insert (3). Accordingly, the Reimann reference fails to anticipate, teach or suggest the claimed invention of the present application.

III. Rejection under 35 U.S.C. § 103(a) over Boyd et al. (U.S. 5,799,661)

Claims 3, 4, 7-10, 22, and 23

Claims 3, 4, 7-10, 22, and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Boyd et al. (U.S. 5,799,661). The Examiner contends that it would be obvious to one of ordinary skill in the art to modify an apparatus as disclosed in Boyd et al. to include the features as claimed. The Examiner, however, has failed to establish a *prima facie* case of obviousness since the Examiner has failed to cite a reference or combination of references that produce an invention as defined in claims 3, 4, 7-10, 22, and 23, which include by dependency all the features of claim 1. Claim 1 of the present invention discloses a vacuum gripper for suctioning work pieces. The gripper includes a suction body having a contact surface and a microstructure projecting from the contact surface. The microstructure is formed of a plurality of elements having a rod, louver or pin-shaped configuration. The elements have a free end that is intersected by a longitudinal axis of the elements. The free end is displaced away from the contact surface and the longitudinal axis is oriented to intersect the contact surface and the free end of the elements. The Boyd reference, however, does not disclose orienting the longitudinal axis of bumps (199) so as to intersect a free end of the bumps and contact surface (198). Claim 1 of the present application requires the longitudinal axis of the elements to intersect both the contact surface from which the element extends and the free end of the element, which itself is displaced from the contact surface. The term "longitudinal" commonly refers to the lengthwise dimension of a geometric shape, which in turn corresponds to the longest of three straight-line dimensions of a three-dimensional object. (Webster's Third New International Dictionary, unabridged, 1993). The longitudinal axis of claim 1 thus coincides with the longest dimension of the element. Orienting the friction elements so that the longitudinal axis (i.e., longest dimension) extends away from the contact surface, as claimed in the present application, enables the

elements to buckle and bend when the contact surface of the suction body abuts the work piece. (See paragraph [0011] of the present application). In contrast to the claimed invention of the present application, the longitudinal axis of bumps (199) in the Boyd reference does not intersect both a free end of the bumps and contact surface (198), but instead extends parallel to the contact surface. The width of bumps (198) shown in Fig. 33B (measured parallel to contact surface (198)) is greater than the height of the bumps (measured perpendicular to contact surface (198)). Since the longitudinal axis coincides with the larger of the two dimensions, the longitudinal axis extends along the width, not the height, of the bumps, and parallel to contact surface (198). A line extending parallel to a surface, cannot by definition, intersect the surface, and as such, the longitudinal axis of the bumps does not intersect the contact surface as required by claim 1 of the present application. Furthermore, although Boyd discloses that bumps (199) may include other geometries, such as conical and cylindrical, there is no mention of the orientation of the longitudinal axis of the bumps.

Boyd et al. also does not render obvious the concept of orientating the longitudinal axis of the friction-increasing bumps (199) so as to intersect both the free end of the bumps and contact surface (198). This would result in the bumps having a high profile, wherein the height of the bumps is greater than their width, rather than a low profile. There is nothing, however, in the Boyd reference that suggests configuring the friction-increasing bumps (199) to have a high profile rather than a low profile is preferred or even desirable. The Boyd reference only shows friction-increasing bumps having a low profile (i.e., their width is greater than their height). (See Fig. 33B). Low profile bumps minimize the possibility of the bumps puncturing or damaging the heart muscle tissue. Orienting the bumps so as to have the longitudinal axis (i.e., longest dimension of the bumps) extend out from rather than parallel to the contact surface rather will result in the bumps having a high profile. This would likely increase the localized pressure being asserted by the bumps on the heart muscle, which in turn could damage the heart muscle tissue, making such a configuration obviously undesirable.

Applicant also submits that the Boyd reference is not analogous art. The current invention discloses a suction gripping device for facilitating the picking up and transporting of

large metal or glass sheets having a smooth surface that may also be wet or oily (See paragraphs [0002] and [008] of the present application). A person of ordinary skill in the art would not be motivated to look to a device for performing thoracoscopic cardiac procedures, specifically a device for picking up a heart without damaging the delicate heart tissue to treat multi-vessel coronary artery disease (see column 1, lines 14-19 of Boyd), as disclosed in the Boyd reference, for a solution for gripping a sheet of metal having an oily or slippery surface.

Accordingly, the Boyd reference fails to anticipate, teach, or suggest the claimed invention of the present Application.

Claim 7

With respect to claims 7, the Examiner contends that Boyd et al. discloses a high friction material cast on the surface of the suction cup (see column 19, lines 13-19 of Boyd et al.) that purportedly corresponds to the carrier formed as a flat plate of file of claim 7. The Examiner, however, has failed to establish a *prima facie* case of obviousness since the Examiner has failed to cite a reference or combination of references that produce an invention as defined in claim 7, which includes by dependency all the features of claims 1 and 6. As discussed previously with respect to the rejection of claim 1 under 35 U.S.C. § 102(b), the Boyd reference does not disclose orienting the longitudinal axis of bumps (199) so as to intersect a free end of the bumps and contact surface (198). Also, as discussed previously with respect to the rejection of claim 6 under 35 U.S.C. § 102(b), Boyd does not does disposing the friction-increasing elements on a carrier to be attached to the vacuum gripper. Since Boyd is devoid of a carrier, the reference also does not disclose a carrier configured as a plate or film. Although Boyd discloses the use of a fabric adhered to the surface of the suction cup, which the Examiner contends corresponds to the film or layer of claim 7, the fabric is of a mesh material that creates elements that are oriented parallel to the contact surface. Claim 7 includes by dependency the features of claim 1. Therefore, the longitudinal axis of the elements disposed on the carrier must intersect the free and of the elements (which is displaced from the contact surface) and the contact surface. The fabric mesh disclosed in the Boyd reference is devoid of this feature. Therefore, the Boyd reference is insufficient to form a proper *prima facie* obviousness type rejection of claim 7.

Claims 9 and 22

With respect to claims 9 and 22, the Examiner states that Boyd discloses the height of the bumps and the geometry and pattern of the bumps, but concedes that Boyd does not disclose the thickness of the bumps. Without knowing the thickness of the bumps it is impossible to determine the length to width ratio (aspect ratio) of the bumps. The Examiner nevertheless contends that it would have been obvious to one of ordinary skill in the art to construct the bumps to be thick enough to provide a reliable, flexible, friction grip, but slender enough to prevent damaging the heart tissue.

The Examiner, however, has failed to establish a *prima facie* case of obviousness by failing to cite a reference or combination of references that produce an invention as defined in claims 9 and 22, which includes by dependency all the features of claim 1. As discussed previously with respect to the rejection of claim 1 under 35 U.S.C. § 102(b), the Boyd reference does not disclose orienting the longitudinal axis of bumps (199) so as to intersect a free end of the bumps and contact surface (198). The Examiner also has provided nothing more than a mere statement that it would have been obvious to one of ordinary skill in the art to construct the bumps disclosed in Boyd in the manner as claimed in the present application. Such a statement without providing some objective reason why it would have been obvious to modify the device shown in Boyd to correspond with the claimed invention of the present application it not sufficient to establish a *prima facie* case of obviousness. *See Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). The desirability or motivation to modify the device in Boyd must come from the prior art. *See In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). The Examiner, however, has not provided and objective reasons why it would have been desirable to modify the bumps of Boyd to correspond with the claimed invention of the present application. Also, the level of skill in the art cannot be relied upon to provide the suggestion to modify the cited reference to meet the claimed invention. *See Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed Cir. 1999). Boyd does not include any disclosure whatsoever regarding the aspect ratio of the friction-increasing bumps, let alone describe a range of aspect ratios that overlap or even approximate the aspect ratios claimed in the present application. This

coupled with the fact that the Examiner has not provided any objective motivation for modifying the bumps in Boyd to meet the claimed invention of the present application demonstrates that a *prima facie* case of obviousness has not been established with respect to claims 9 and 22.

Claims 10 and 23

With respect to claims 10 and 23, the Examiner states that Boyd discloses the height of the bumps and the geometry and pattern of the bumps, but concedes that Boyd does not disclose the thickness of the bumps. Without knowing the thickness of the bumps it is impossible to determine the spacing to width ratio (spacing ratio) of the bumps. The Examiner nevertheless contends that it would have been obvious to one of ordinary skill in the art to construct the bumps to be thick enough to provide a reliable, flexible, friction grip, but slender enough to prevent damaging the heart tissue.

The Examiner, however, has failed to establish a *prima facie* case of obviousness by failing to cite a reference or combination of references that produce an invention as defined in claims 9 and 22, which includes by dependency all the features of claim 1. As discussed previously with respect to the rejection of claim 1 under 35 U.S.C. § 102(b), the Boyd reference does not disclose orienting the longitudinal axis of bumps (199) so as to intersect a free end of the bumps and contact surface (198). The Examiner also has provided nothing more than a mere statement that it would have been obvious to one of ordinary skill in the art to construct the bumps disclosed in Boyd in the manner as claimed in the present application. Such a statement without providing some objective reason why it would have been obvious to modify the device shown in Boyd to correspond with the claimed invention of the present application it not sufficient to establish a *prima facie* case of obviousness. *See Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). The desirability or motivation to modify the device in Boyd must come from the prior art. *See In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). The Examiner, however, has not provided and objective reasons why it would have been desirable to modify the bumps of Boyd to correspond with the claimed invention of the present application. Also, the level of skill in the art cannot be relied upon to provide the suggestion to modify the cited reference to meet the claimed invention. *See Al-Site Corp. v. VSI Int'l Inc.*, 174

F.3d 1308, 50 USPQ2d 1161 (Fed Cir. 1999). Boyd does not include any disclosure whatsoever regarding the spacing ratio of the friction-increasing bumps, let alone describe a range of spacing ratios that overlap or even approximate the spacing ratios claimed in the present application. This coupled with the fact that the Examiner has not provided any objective motivation for modifying the bumps in Boyd to meet the claimed invention of the present application demonstrates that a *prima facie* case of obviousness has not been established with respect to claims 10 and 23.

CONCLUSION

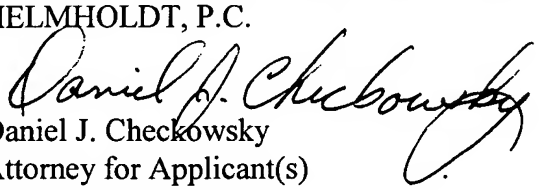
For the reasons set forth above, it is respectfully submitted that Applicants' invention as set forth in claims 1-24 patentably define over the cited reference and is not anticipated, suggested, or rendered obvious thereby. As such, it is respectfully submitted that Examiner's final rejection of claims 1-24 is erroneously based and its reversal is respectfully requested.

No oral hearing is requested.

Applicants' attorney's check in the amount of $500.00 is enclosed to cover the Appeal Brief filing fee. Please charge any deficiencies to Applicant's deposit account no. 25-0115.

Respectfully submitted,

YOUNG, BASILE, HANLON, MacFARLANE, WOOD & HELMHOLDT, P.C.



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Dated: June 28, 2006
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APPENDIX INDEX

APPENDIX A: CLAIMS AT ISSUE IN APPEAL

1. A vacuum gripper for suctioning work pieces comprising:

a flexible suction body;

a side of the suction body facing a workpiece including a sealing lip bounding a vacuum chamber, the vacuum chamber connected by air flow to a vacuum connection;

the suction body having a contact surface abutting the work piece with prevailing vacuum in the vacuum chamber; and

a microstructure projecting from the contact surface and formed of one of a rod, louver and pin-shaped elements, the elements having a free end intersected by a longitudinal axis of the elements, the free end being displaced away from the contact surface and the longitudinal axis oriented so as to intersect the contact surface.

2. The vacuum gripper in accordance with claim 1, wherein the elements are part of a microstructure.

3. The vacuum gripper in accordance with claim 1, wherein at least one of the elements and the free ends of the elements are pliably flexible.

4. The vacuum gripper in accordance with claim 1, wherein the elements are formed of the same material as the suction body.

5. The vacuum gripper in accordance with claim 1, wherein the elements are disposed as one piece on the suction body.

6. The vacuum gripper in accordance with claim 1, wherein the elements are disposed on a carrier to be attached to the suction body.

7. The vacuum gripper in accordance with claim 6, wherein the carrier is one of a plate and a film.

8. The vacuum gripper in accordance with claim 1, wherein the elements are made of plastic.

9. The vacuum gripper in accordance with claim 1, wherein a length of the elements is two to twenty times greater than a thickness of the elements.

10. The vacuum gripper in accordance with claim 1, wherein the elements are at a distance from each other that corresponds to 0.5 to 2.5 times a thickness of the elements.

11. The vacuum gripper in accordance with claim 1, wherein the elements have one of a rounded, a flattened and a pointed free end.

12. The vacuum gripper in accordance with claim 1, wherein the elements have one of a circular, an elliptical and a flat cross section.

13. The vacuum gripper in accordance with claim 12, wherein a blade plane for elements with a flat cross section extends in the circumferential direction of the vacuum gripper.

14. The vacuum gripper in accordance with claim 1, wherein the elements project perpendicularly from the contact surface.

15. The vacuum gripper in accordance with claim 1, wherein the sealing lip is free of the elements.

16. The vacuum gripper in accordance with claim 1, wherein the elements extend over 70 to 95% of the vacuum gripper's radius, starting from the center of the vacuum gripper.

17. The vacuum gripper in accordance with claim 1, wherein a length of the elements measures 0.1 to 3mm.

18. A method for producing a suction gripper having a flexible suction body that includes a contact surface and a microstructure projecting from the contact surface, the microstructure formed of one of a rod, louver and pin-shaped elements, the method comprising the step of injecting molding the suction body.

19. The method in accordance with claim 18, comprising the step of:
cutting the elements at least partially out of the contact surface by means of a laser.

20. The method in accordance with claim 18, comprising the step of adhering, at least in sections, a film forming the elements to the contact surface.

21. The method in accordance with claim 20, comprising the step of adhering several films on top of each other.

22. The vacuum gripper in accordance with claim 1, wherein a length of the elements is five to ten times greater than a thickness of the elements.

23. The vacuum gripper in accordance with claim 1, wherein the elements are at a distance from each other that corresponds to one to two times a thickness of the elements.

24. The vacuum gripper in accordance with claim 1, wherein a length of the elements measures 0.5 to1.0 mm.

APPENDIX B: Evidence

APPENDIX C: Related Proceedings